L4 - Lines of Best Fit, Extrapolation & Interpolation

To be able to make predictions, we need to model the data with a line or a curve of best fit.

Rules for drawing a line of best fit:

1. The line must follow the _____trend or pattern_____.
2. The line should _____go_____ through as many points as possible.
3. There should be _____equal number_____ of points above and below the line.
4. The line should pass through points all along the line, not just at the ends.

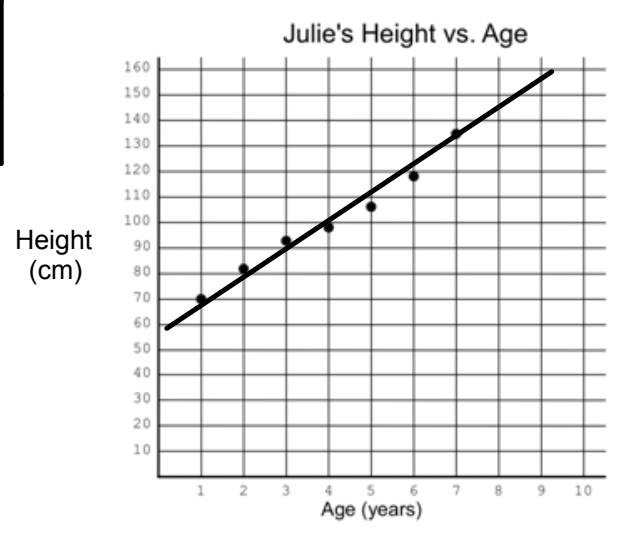
Making Predictions

Use your line of best fit to estimate the following:

Question	Answer	Method of Prediction (TOV or graph)
How tall was Julie when she was 5 years old?	106	TOV
How tall will Julie be when she is 9 years old?	150	graph
How old was Julie at 100 cm tall?	4 age	graph

Example:
Julie gathered information about her age and height from the markings on the wall in her house.

Age (years)	1	2	3	4	5	6	7	8
Height (cm)	70	82	93	98	106	118	127	135

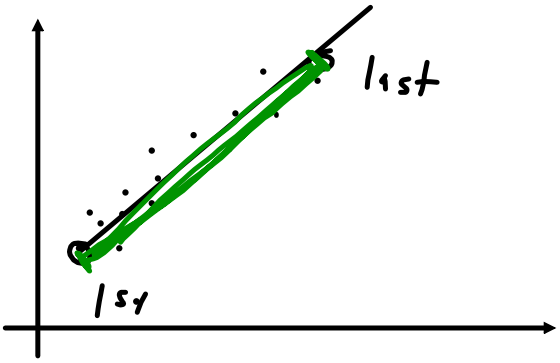


Interpolate

When you interpolate, you are making a prediction _____inside_____ the data.

These predictions are usually _____accurate or reliable_____.

Hint:
You are interpolating when the value you are finding is somewhere between the first point and the last point.



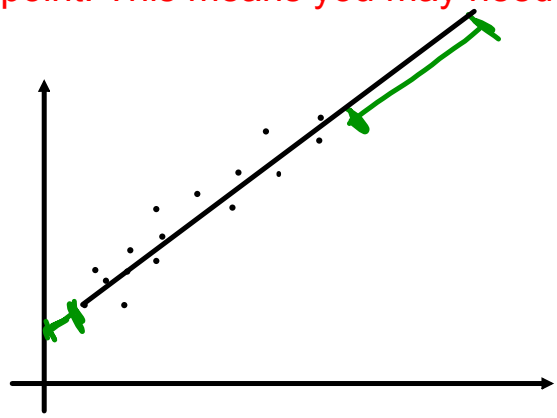
Extrapolate

When you extrapolate, you are making a prediction _____outside_____ the data.

It often requires you to _____extend_____the line.

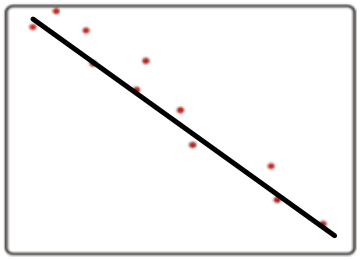
These predictions are less reliable.

Hint:
You are extrapolating when the value you are finding is before the first point or after the last point. This means you may need to extend the line.



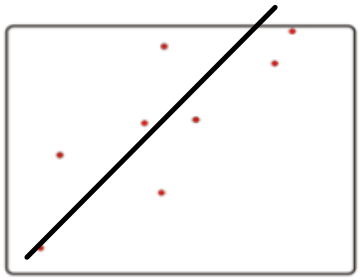
Describing Scatter Plots and Lines of Best Fit

Draw a line of best fit for each of the scatter plots that show a linear relationship below. Write two or three key words to describe each relation on the line below the scatter plot. (rises upward to the right, falls downward to the right, no relationship, strong, weak, linear, non-linear)



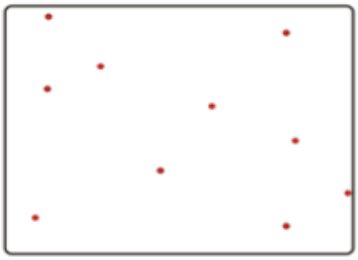
a)

- falls downward to the right
- strong
- linear



b)

- rises upward to the right
- weak
- linear



c)

- no relationship
- non-linear

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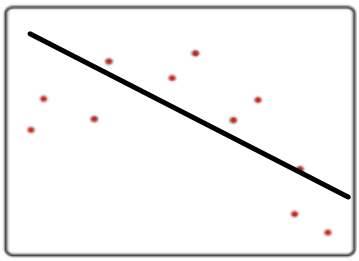
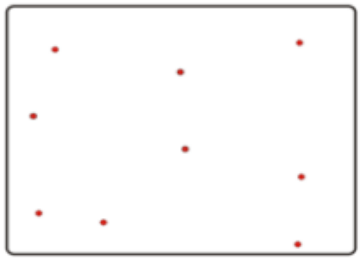
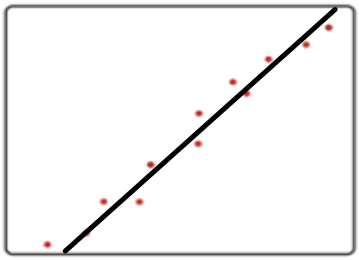


d) _____



e) _____



f) _____

- fall down to the right
- weak
- linear

- no relationship
- non-linear

- rises upward to the right.
- strong
- linear

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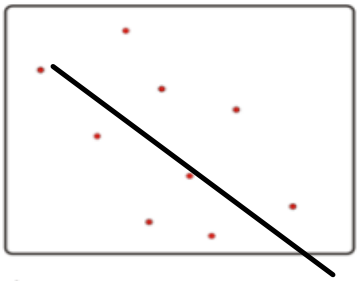
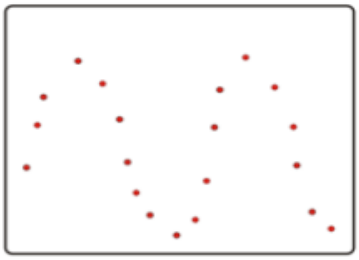
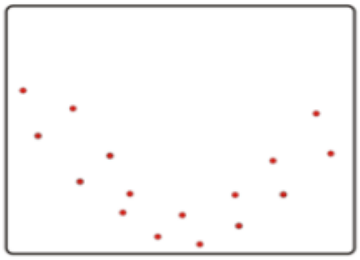


g) _____



h) _____



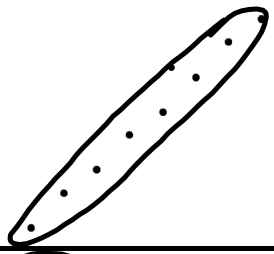
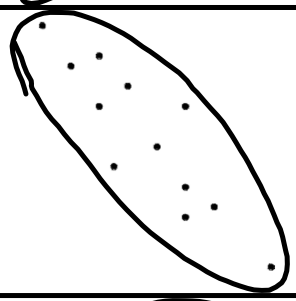
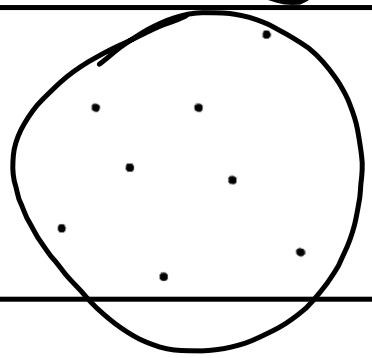
i) _____

- Weak
- linear

- no relationship
- non-linear

- no relationship
- non-linear

Correlation

	A scatter plot shows a Positive correlation when the pattern rises up to the right. This means that the two quantities increase together.
	A scatter plot shows a negative correlation when the pattern falls down to the right. This means that as one quantity increases the other decreases.
	A scatter plot shows no correlation when no pattern appears Hint:If the points are roughly enclosed by a circle, then there is no correlation.

Strong or Weak?

If the points nearly form a line, then the correlation is _____Strong_____.

If the points are dispersed more widely, but still form a rough line, then the correlation is _____Weak_____.

Hint:
To visualize this, enclose the plotted points in an oval.

If the oval is ***thin***, then the correlation is ***strong***.
If the oval is ***fat***, then the correlation is ***weak***.